

What is Claimed is:

1. A process for producing a substantially crystalline graphitic nanofiber wherein at least a portion of which are comprised of graphite sheets that are substantially parallel to the longitudinal axis of the nanofiber, which process comprises reacting a mixture of CO/H₂ in the presence of a catalyst selected from the group consisting of Fe, Fe:Cu bimetallic, and Fe:Ni bimetallic powder catalysts for an effective amount of time at a temperature from about 625°C to about 725°C.
- 10 2. The process of claim 1 wherein said nanofibers are characterized as having separate and non-continuous substantially graphite sheets.
3. The process of claim 1 wherein said nanofibers are characterized as having continuous substantially graphite sheets forming a non-cylindrical multifaceted tubular structure.
- 15 4. The process of claim 1 wherein the catalyst is an Fe:Cu bimetallic wherein the ratio of Fe to Cu is from about 1:99 to about 99:1.
5. The process of claim 4 wherein the ratio of Fe to Cu is from about 3:7 to about 7:3.
- 20 6. The process of claim 5 wherein the ration of Fe to Cu is about 7:3 and the temperature is about 650°C.
7. The process of claim 1 wherein the catalyst is an Fe:Ni bimetallic wherein the ratio of Fe to Ni is from about 1:99 to about 99:1.
8. The process of claim 7 wherein the ratio of Fe to Ni is from about 3:7 to about 7:3

9. The process of claim 1 wherein the ratio of CO to H₂ is from about 95:5 to about 5:95.
10. The process of claim 9 wherein the ratio of CO to H₂ is from about 80:20 to about 20:80.
- 5 11. The process of claim 5 wherein the ratio of CO to H₂ is from about 80:20 to about 20:80.
12. The process of claim 6 wherein the ratio of CO to H₂ is about 80:20.
13. The process of claim 1 wherein the crystallinity of the nanofiber is greater than about 98%.
- 10 14. The process of claim 5 wherein the crystallinity of the nanofiber is greater than about 98%.
- 15 15. The process of claim 1 wherein the particle size of the bimetallic powder is from about 0.25 nanometers to about 5 micrometers.
- 15 16. The process of claim 14 wherein the particle size of the bimetallic powder is from about 2.5 nanometers to about 1 micrometer.
17. The product produced by the process of claim 1.
18. The product produced by the process of claim 6.
19. The product produced by the process of claim 12.